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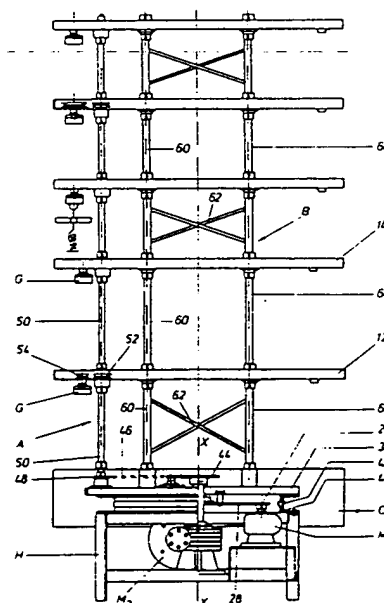
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54 A rotary box for storing and mixing colors, paints and the like.

57 Apparatus for storing and mixing basic colors of paints or the like, consisting of a stirring rotary box comprising a rotary circular shelving formed of a motor-driven base and a plurality of mechanical shelves, each of which is provided on its upper surface with a plurality of elastic clamping means for locating and retaining the paint cans. In its lower surface each shelf is provided with a corresponding number of spindles for rotating the stirrers of the associated cans, the capacity of which can suitably change from one to another shelf.



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The present invention relates to a stirring rotary box for storing and mixing colors, paints and the like.

It is known that in the practical preparation of formulations of colors, paints and the like, for example for use in car body shops, wall shelving is widely employed having a worktable and a plurality of shelves supporting the different color or paint containing cans or containers, the content of which has to be stirred in order to obtain a better homogenizing thereof before use. This shelving, therefore, is provided with stirring means which can be inserted within the corresponding cans.

The known shelving, due to its own structure, is bulky in construction as compared with the cans it is supporting and is generally anchored to a wall, thereby resulting in a fixed structure. The capacity of this shelving is not very great and the operator, when he must mix the different basic colors in order to obtain the desired colored paint, is compelled to move along the shelving to find and get the different color cans.

Generally, this shelving is of such a structure as to offer the only possibility of quickly stirring the paints, which, in some cases, can overheat, causing the solvents to evaporate with the result of having a change in the paint viscosity.

This invention aims to overcome these and other disadvantages by providing an apparatus for storing and mixing basic colors, paints and the like, which can be used in car body shops for example, characterized in that it consists of a stirring rotary box comprising a rotary preferably circular shaped shelving, formed of a motor-driven base and a plurality of shelves each of which is provided on its upper surface with a plurality of elastic clamping means for locating and retaining paint cans or tins, whereas on its lower surface each shelf is provided with a corresponding number of spindles adapted to operate stirrers of the single cans, the

capacity of which can be quite different from one to another shelf.

The shelves are modular in nature so that on the same base one or more subshelves can be mounted, according to preference, which are intended to carry either small or great paint cans, the capacity of these cans ranging for example from 1 litre to 4 litres.

The motor-driven base includes two electric motors, the former of which, through an associated drive, causes the slow rotation of the rotary box about its vertical axis, whereas the latter, through an associated drive, causes the fast rotation of a single driving shaft, which can be extended from one to another shelf by means of rods and conventional joints, in order to transmit its fast rotation to the plurality of stirrer carrying spindles so as to induce the stirring of the content of each can and therefore of all the cans arranged on the different shelves in such a manner that the operator, without moving along the apparatus, can operate a suitable control switch causing the rotary box rotation and then stop this rotation once the desired can or cans have moved in their pick up positions, the complete rotation of the rotary box taking about half a minute so that the operator has soon at hand the desired colors or paints without the necessity of moving along the apparatus and transporting fore and back the cans required for the preparation of the desired colored paint.

These and other features of the present invention will be now illustrated in the following description taken in connection with the accompanying drawings, description and drawings being given by way of example only and not intended to limit the scope of the invention.

In the drawings:

Fig. 1 shows a diagrammatic elevational view of a rotary box apparatus according to the invention;

Fig. 2 shows a view similar to that of Fig. 1, illustrating the details of the rotary box motorization;

Fig. 3 shows a diagrammatic top plan view taken at the level of a 1-litre can shelf;

Fig. 4 finally shows a top plan view taken at the level of a 3-4-litre can shelf.

Referring to the drawing, there is shown the apparatus A for storing and mixing basic colors, paints and the like, for example for use in car body shops or the like, which apparatus consists of a stirring rotary box B comprising a shelving, in this case circular in shape, which is formed of a motor-driven base C and a plurality of mechanical shelves 10, 12, 14, 16, 18, 19, each of which is provided on its upper surface 20 with a plurality of elastic clamps 22, one only being shown in Fig. 1, for locating and retaining cans D and F, the former having a greater capacity than the latter, which cans contain the different colors or paints.

Each shelf, with the exception of the shelf 10, is provided on its lower surface with a corresponding number of spindles G intended to bring into rotation stirrers 24 which are inserted in the single cans in order to stir the content thereof.

The motor-driven base C is supported by a supporting frame H carrying two electric motors  $M_1$  and  $M_2$ , the first of which, through a sprocket 26 and a chain 28 in mesh with a suitable gearing means fastened to a circular table 38 bearing on a support member 40, through a thrust bearing 42, causes the rotation of the circular table 38 and the base C about the vertical axis X-X of apparatus together with the rotary box B secured to the circular table 38. The second electric motor  $M_2$  transmits its own rotation movement to the sprocket 44 in mesh with a chain 46 driving the sprocket 48 keyed to a vertical driving shaft 50.

In practice, the driving shaft 50 is provided at its upper end with a pulley 52 keyed thereto and connected through a belt not shown

to a pulley 54 keyed to the spindle G intended to operate, through a conventional joint, the associated stirrer 24, from the pulley 52 deriving the rotation of all the pulleys of the single spindles of the associated shelf, in this case the shelf 12.

In the foregoing, the slow rotation movement of the rotating box B about the axis X-X and the fast rotation movement of the driving shaft 50 and therefore of the associated spindles have been described.

As already said, the rotary box can be increased or decreased in height by adding or removing shelves as a function of the number of cans D, F it is desired to be available. For this purpose, a series of four uprights 60, suitably stiffened by bracing means 62 are provided between a shelf and a next one in such a manner that a stacking of several shelves and several shaft sections 50' for driving the spindles becomes possible.

For example, in order to have, starting from the rotary box comprising the first shelf 10 and the second shelf 12, a rotary box comprising also the third shelf 14, this shelf 14 will be firmly mounted on the shelf 12 by means of rods 60, while through a conventional joint the shaft section 50' will be connected to the driving shaft 50 in order to have the continuity of the stirring operation, on the upper portion of the shelf 14 there being the same transmission of the rotary movement from the pulley 52 (not shown) to the pulley 54 (not shown) so that the spindle G and all the other spindles on the shaft 14 are brought into rotation under control of motor  $M_2$ .

Referring to Figs.3 and 4, wherein the circular shape of the rotary box B can be seen, 70 designates the control board provided with a pair of switches 72,74 for controlling the rotation and the stirring operations of apparatus, as well as a timer knob 73. It is to be noted that the side 76 of the framework formed of the uprights 60 is open at the interspace 78 between two cans F of a same vertical row,

and this in order to make the center portion of the rotary shelf accessible so as to permit the storage of other paint cans in this portion.

The width of the rotary box, which as already said and shown has a circular shape, is of 1 meter in diameter, whereas the height thereof is depending on the shelf number and may range from a minimum of 0.85 meters with a shelf for 1-litre cans only to 2.10 meters with two shelves for three to four-litre cans plus three shelves for one-litre cans. The standard height is 1.85 meters corresponding to two shelves for three to four-litre cans plus two shelves for one-litre cans.

In this space (diameter 1 meter and height 1.85 meters), in addition to the rotation and stirring mechanisms, 62 paint cans can be accommodated, namely 24 three to four-litre cans on two shelves and 38 one-litre cans on further two shelves.

The circular conformation of this shelving permits it to be installed in any location of the work room, either at the center or in a corner, while a conventional shelving for storing 58 cans rather than 62 cans would take up over 3 meters in length and about 2 meters in height.

The different combinations of the shelves 10, 12, 14 and so on permit a maximum of over 100 cans to be accommodated, while the center portion of each shelf permits further possible cans to be stocked.

From the operational standpoint it is evident that when the base C rotates about the axis X-X, all the rotary box B together <sup>with</sup> the several shelves will rotate, and when the driving shaft 50 rotates together with the several spindles of the shelf 12 for stirring the content of the cans D, all the other shaft sections 50' connected thereto will rotate, resulting in a rotation of all the spindles of the

several shelves and therefore of the associated stirrers 24 inserted in the associated cans D, F.

The cans D, F can be stored on the rotating box B in any suitable manner, depending upon the requirements and customs of the user. However, it is advisable to store the single cans divided in sectors so as to have on the same vertical sectors, for example the sectors indicated in S in Fig. 1, cans whose content is of similar nature and forming part of the same formulation (it is evident that in Fig. 1 the plurality of cans stored on the single shelves have been omitted from the drawings for clarity of illustration, two cans only being illustrated on each shelf).

As said hereinbefore, the rotary box B is provided with a control board 70 for controlling all the following operations: by depressing the push-button of switch 72 the rotation of the rotary box about the axis X-X for the search of desired can or can sector is started; by depressing <sup>again</sup> the push-button of switch 72 the rotation of the rotary box B is stopped; by depressing the push-button of switch 74 the rotation of the driving shaft 50 and therefore the stirrers 24 is started; by depressing again the push-button of switch 74 the rotation of the driving shaft 50 and the stirrers 24 is stopped or the timer 73 is activated, which then automatically stops this operation.

The power rating is of 735 watts, divided between the two motors  $M_1$  and  $M_2$  for the separated operation of the rotation and stirring operation, respectively.

As to the stirring of the can contents, at the beginning of a day the operator presets the timer 73 for the stirring time and operates the switch 74 for starting the stirring operation. The rotary box provides further for a slow and continuous stirring operation, since the driving mechanisms for the rotation and the stirring are connected to each other within the motor-driven base C by means of a planetary

movement of the sprocket 48 along its chain:46 when the motor  $M_2$  is at rest. This will impart to the rotary box the novel and important feature of permitting the slow and continuous mixing of the can contents, which is obtained merely by leaving the rotary box in rotation. In the practice, with the motor  $M_2$  for the stirring operation in a rest condition and the motor  $M_1$  for the rotary box rotation . . . operating, the sprocket 48 driving the shaft 50 rotates along the chain 46 at a so very reduced RPM as to keep in rotation the driving shaft 50, the shaft sections 50' and therefore the spindles G with the stirrers 24.

As far as the working location is concerned, the operator operates the switch 72 and when the desired color or paint cans are at his hand due to the preset rotation of the base C together with the rotary box he stops the rotation movement thereof.

In this manner, the operator has soon at hand the desired colors or paints without the necessity of moving along the apparatus and transporting fore and back to the mixing location the desired colors or paints necessary for obtaining the desired formulation.

As known, the fast stirring (about 85 RPM) is the usual periodical operation performed on the paints before use and the starting of this operation is activated at the control board 70 through the switch 74, while the stop of this operation can occur both by hand through the above mentioned switch and automatically through the timer 73 which has been preset for the desired stirring time up to 15 minutes. This stirring operation has to be suitably carried out one or two times by day for about 10 minutes.

Briefly stated, the advantages of the apparatus according to this invention are the following: the rotary box B is compact in structure, covering a surface of less than one square meter in plan; it is not anchored to walls and therefore it can be located anywhere; it has a very great capacity being able to store up to 100 cans and more in a



readily accessible location; it is very comfortable since the operator has at hand all the paint cans without the necessity of moving from the work station; it performs the double function of a fast and slow stirring of the paints; finally, it assures the constant homogeneity of the paints due to the possibility of a continuous mixing of the paints, without any overheat and deterioration thereof by solvent evaporation resulting in a change of viscosity.

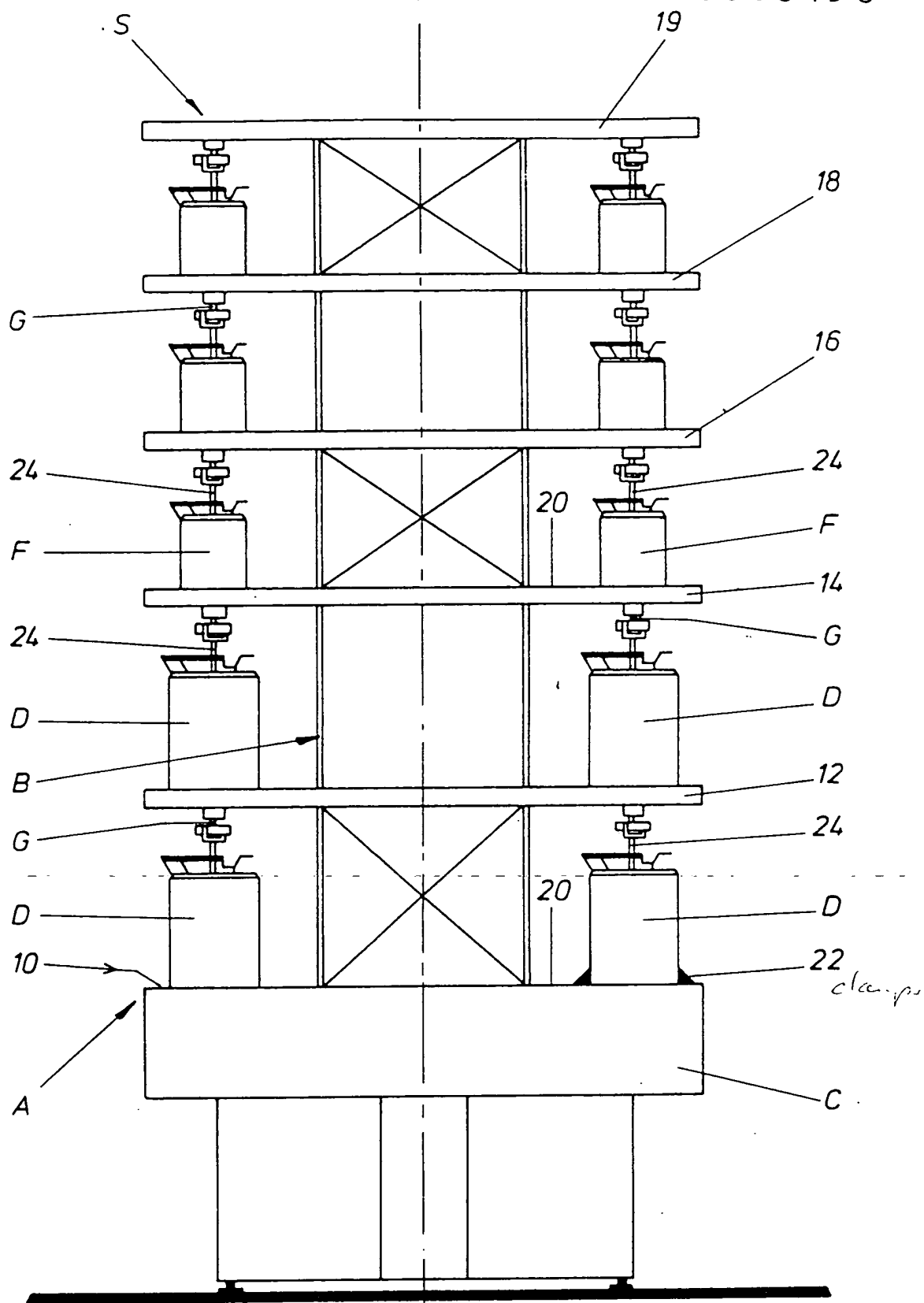
C L A I M S

- 1) An apparatus for storing and mixing basic colors, paints and the like, which can be used in car body shops for example, characterized in that it consists of a stirring rotary box comprising a rotary, preferably circular shaped shelving, formed of a motor-driven base and a plurality of shelves each of which is provided on its upper surface with a plurality of elastic clamping means for locating and retaining paint cans or tins, whereas on its lower surface each shelf is provided with a corresponding number of spindles adapted to operate stirrers of the single cans, the capacity of which can be quite different from one to another shelf.
- 2) Apparatus as claimed in claim 1, characterized in that the shelves are modular in nature so that on the same base one or more subshelves can be mounted, according to preference, which are intended to carry either small or great paint cans, the capacity of these cans ranging from 1 litre to 4 litres, for example.
- 3) Apparatus as claimed in claim 1, characterized in that the motor-driven base includes two electric motors, the former of which, through an associated drive, causes the slow rotation of the rotary box about its vertical axis, whereas the latter, through an associated drive, causes the fast rotation of a single driving shaft, which can be extended from one to another shelf by means of rods and conventional joints, in order to transmit its fast rotation to the plurality of stirrer carrying spindles so as to induce the stirring of the content of each can and therefore of all the cans arranged on the different shelves in such a manner that the operator, without moving along the apparatus, can operate a suitable control switch causing the rotary box rotation and then stop this rotation once the desired can or cans have moved in their pick up positions, the complete rotation of the

rotary box taking about half a minute so that the operator has soon at hand the desired colors or paints without the necessity of moving along the apparatus and transporting forward and back the cans required for the preparation of the desired colored paint.

- 4) Apparatus as claimed in claim 1, characterized in that it permits a slow and continuous stirring of the content of the plurality of cans carried on the single shelves upon the planetary movement of the sprocket keyed to the driving shaft which occurs when the stirring motor is at rest while the rotary box rotation motor is operating so that said sprocket rotates along its driving chain which is not moved by the stirring motor, said slow and continuous stirring preventing the paints from being overheated<sup>ed</sup> and therefore from being deteriorated by the solvent evaporation.
- 5) Apparatus as claimed in claim 1, characterized in that it shows a circular shape in plan having preferably a diameter of one meter while the height thereof is dependent upon the shelf number involved, said height ranging from a minimum of 85 centimeters to a maximum of 210 centimeters, the different shelf combinations permitting different can capacities to be achieved up to a maximum of over 100 cans, the center portion of each shelf enabling further cans to be stored as a stock.
- 6) Apparatus as claimed in claim 1, characterized in that the storage of the cans containing different colored paints on the shelves is made in sectors so as to have on the same vertical sectors paints of same kind intended to be used in the same formulation.
- 7) Apparatus as claimed in claim 1, characterized in that a side of the rotary box frame is open at a suitable interspace between two adjacent cans of a same shelf so that said central portion of the shelf is made accessible for the possible storage of other cans through said interspace.

- 8) Apparatus as claimed in at least one of the preceeding claims,  
and as illustrated in the accompanying drawings.

Fig. 1

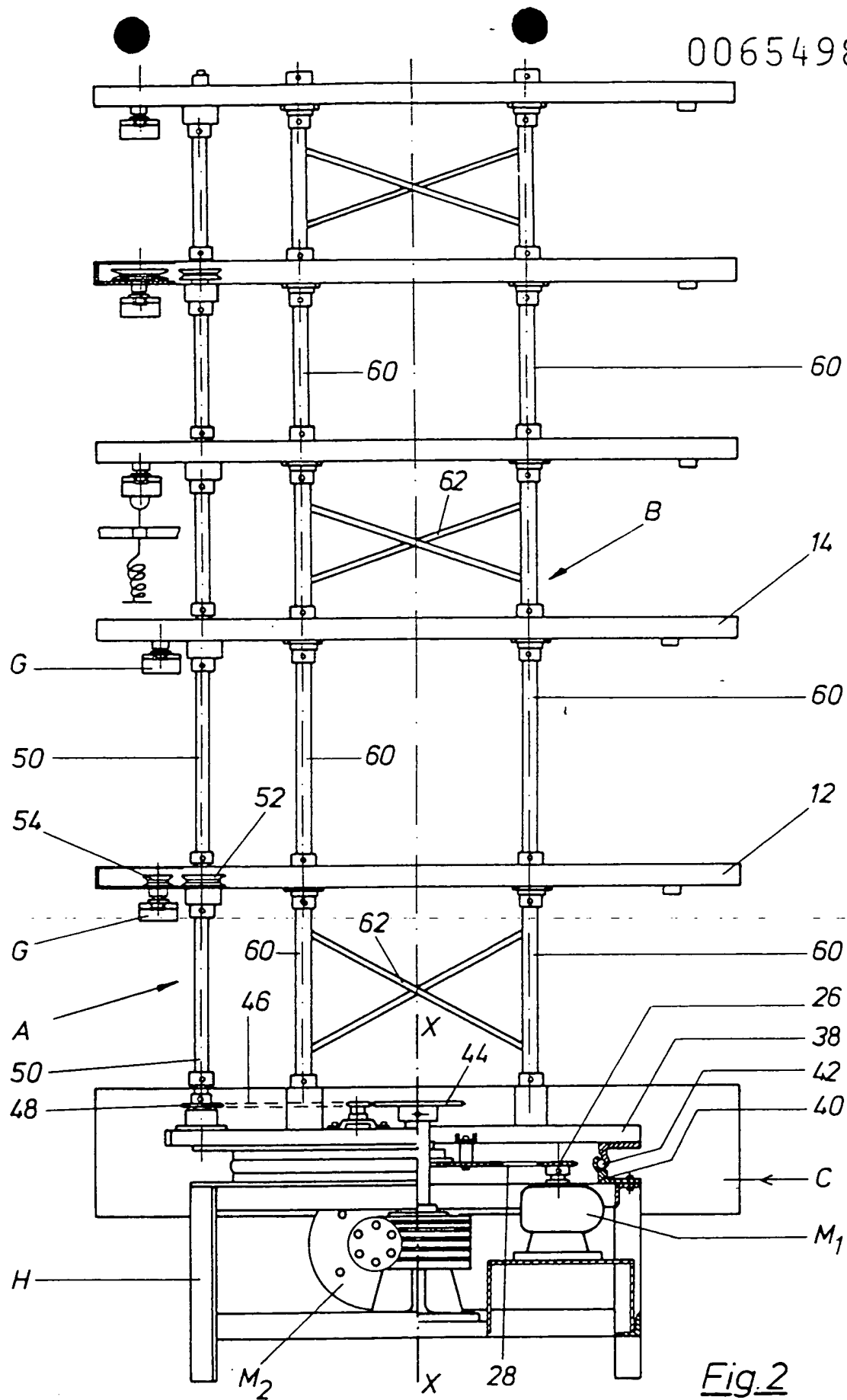
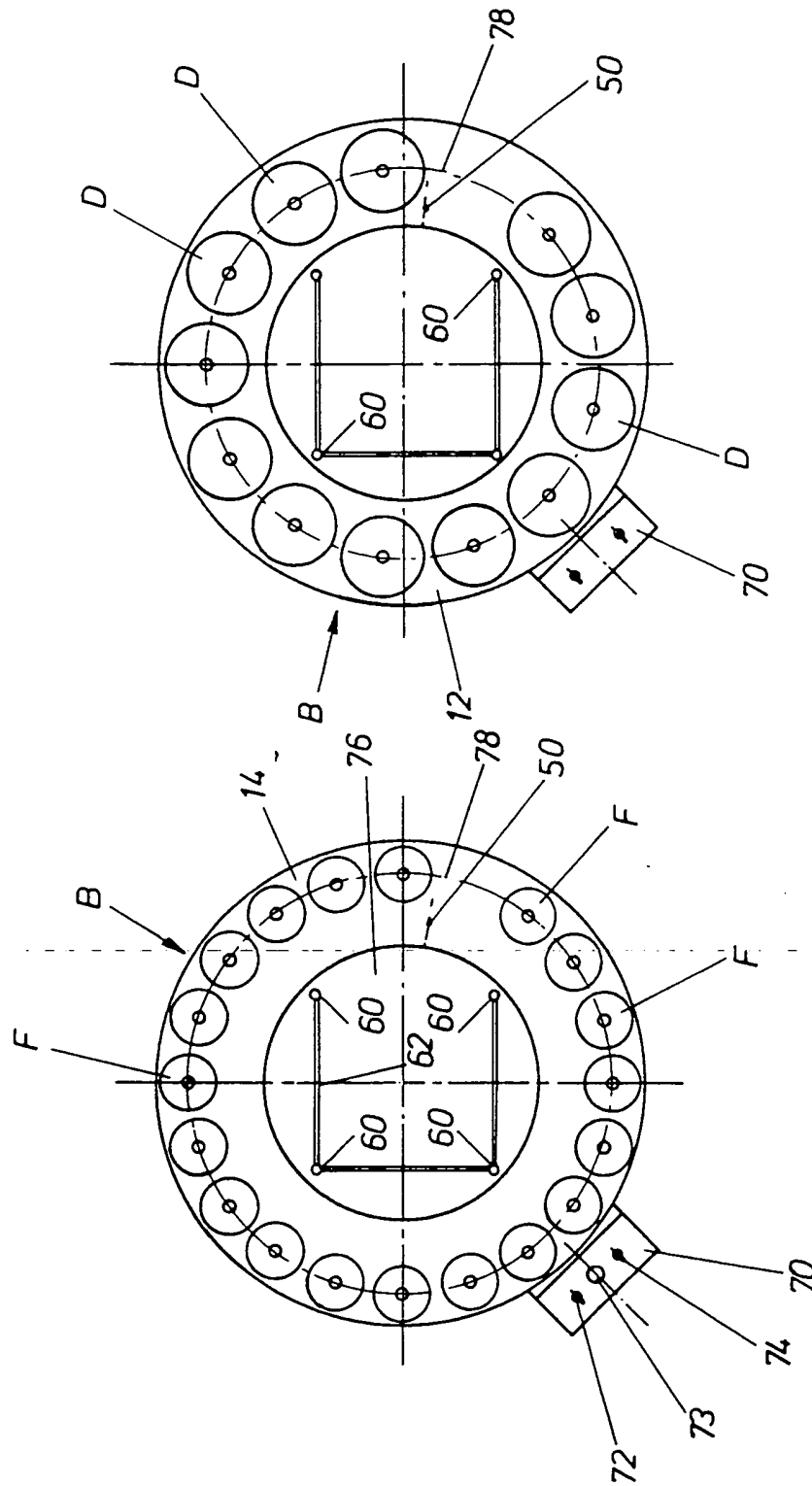


Fig. 2

Fig. 4Fig. 3

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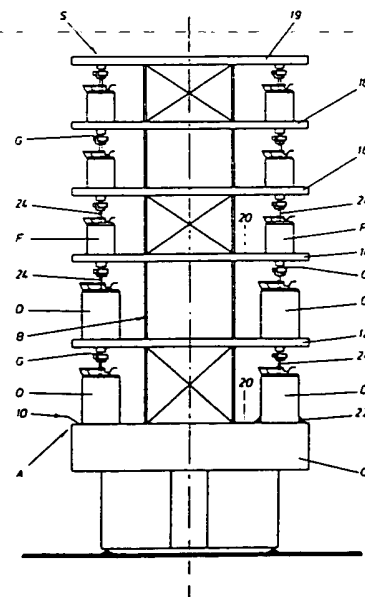
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(54) A rotary box for storing and mixing colors, paints and the like.

(57) The stirring rotary box (B) comprises a rotary circular shelving formed of a motor-driven base (C) and a plurality of mechanical shelves (10, 12, 14, 16, 18, 19) each of which is provided on its upper surface (20) with a plurality of elastic clamping means (22) for locating and retaining the paint cans (D, F). In its lower surface each shelf is provided with a corresponding number of spindles (G) for rotating the stirrers (24) of the associated cans, the capacity of which can suitably change from one to another shelf.



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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
X	FR-A-2 445 167 (MISCELATORI DOSATORI ELETTRONICI MIDEI) *Figures 1-5; claims 1-3,6; page 1, line 1 to page 7, line 25* & GB - A - 2 039 471	1,3,6	B 44 D 3/00 B 44 D 3/06
Y	---	4	
Y	GB-A-1 367 120 (CARSON PARIPAN LIM.) *Figures 2,2a,3-7; claims 1,5,6*	4	
Y	FR-A-1 565 488 (R.A.L.JORRION, A.G.DELPIT) *The whole document*	1	
A	---	2	
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 30-09-1982	Examiner DE LA MORINERIE B.M.
<b>CATEGORY OF CITED DOCUMENTS</b>			
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